

CLAIMS

1. A wave gear device, comprising:

an annular rigid internal gear;

an annular flexible external gear disposed inside the rigid internal gear;

a wave generator for flexing the flexible external gear in a radial direction to cause partial meshing with the rigid internal gear, and causing meshing location of the two gears to rotate in a circumferential direction; and

a bearing mechanism for holding the flexible external gear and the wave generator while allowing the gear and the generator to rotate relative to each other, wherein

the bearing mechanism reversibly switches between a rolling bearing state produced by rolling elements, and a sliding bearing state produced by an oil film or another fluid lubrication film, in accordance with a rotational speed of the wave generator.

2. The wave gear device according to Claim 1, wherein

the wave generator comprises a rigid plug and rolling bearings;

the rolling bearing comprises an inner ring fitted to an external peripheral surface of the rigid plug, an outer ring in contact with an internal peripheral surface of the flexible external gear via a fluid lubrication film, and rolling elements mounted between the inner ring and outer ring; and

the bearing mechanism comprises the rolling bearings, the fluid lubrication film, and a restraining member for restraining the rolling bearings so as to integrally rotate

together with the rigid plug when the rotational speed of the wave generator reaches a prescribed rotational speed or higher.

3. The wave gear device according to Claim 2, wherein the rolling bearing is provided with a retainer that functions as the restraining member and that holds the rolling elements; and

at least a portion of a location of the retainer is displaced outward in a radial direction by centrifugal force exerted on the retainer in association with an increase in the rotational speed of the wave generator, and shifts to a state of contact with the outer ring and/or the rolling elements.

4. The wave gear device according to Claim 3, wherein the location of the retainer is displaced inward in the radial direction by an elastic return force, and shifts to a state of separation from the outer ring and/or the rolling elements when the rotational speed of the wave generator decreases.

5. The wave gear device according to Claim 1 or 2, wherein a surface in frictional contact with the outer ring and/or the rolling elements at the location of the retainer is a high-friction surface having a high friction coefficient in comparison with other portions of the retainer.

6. The wave gear device according to Claim 3, 4, or 5, wherein frictional contact resistance generated between the retainer and the outer ring and/or the rolling elements becomes greater than frictional contact resistance generated between the external peripheral surface of the outer ring and the internal peripheral surface of the flexible external gear

when the wave generator reaches a prescribed rotational speed or higher.

7. The wave gear device according to any of Claims 2 to 6, wherein the rolling bearing is a ball bearing.

8. The wave gear device according to Claim 2, wherein the restraining member is fixed in a radially moveable state with respect to the rigid plug or the inner ring, moves outward in a radial direction by centrifugal force exerted on the restraining member in association with rotation of the wave generator, and shifts to a state of contact with the outer ring and/or the rolling elements.

9. The wave gear device according to Claim 8, wherein the restraining member moves inward in the radial direction by an elastic return force, and shifts to a state of separation from the outer ring and/or the rolling elements when the rotational speed of the wave generator decreases.

10. The wave gear device according to Claim 9, wherein a surface in frictional contact with the outer ring and/or the rolling elements in the restraining member is a high-friction surface having a high friction coefficient in comparison with other portions of the restraining member.

11. The wave gear device according to Claim 8, 9, or 10, wherein frictional contact resistance generated between the restraining member and the outer ring and/or the rolling elements becomes greater than frictional contact resistance generated between an external peripheral surface of the outer ring and an internal peripheral surface of the flexible external gear when the wave generator reaches a prescribed

rotational speed or higher.

12. The wave gear device according to any of Claims 8 to 11, wherein the rolling bearing is a ball bearing.